



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of :
Nagayuki TAKAO et al. :
Serial No. 09/820,313 : Group Art Unit: 1714
Filed: March 29. 2001 : Examiner: C. E. Shosho
For: INK FOR INK JET :
PRINTER :

D E C L A R A T I O N

Commissioner for Patents
Alexandria VA 22313-1450

Sir:

I, Nagayuki TAKAO, declare that I am one of the co-inventors of the above-identified application and familiar with the prosecution history of the present application.

I declare that I have read and understand the official action dated July 16, 2003, issued against the above-identified application and also the references cited in the official action.

I declare that I have carried out the following experiments in order to demonstrate that unexpected superiority of the present invention over the cited

reference, Tsubuko et al. (U.S. Patent No. 5,952,048).

(1.1) The same procedure as in Reference Example 2 of Tsubuko et al. was repeated to prepare Resin No. 2, and the same procedure as in Example 4 of Yamane et al. was repeated to an ink composition No. 4 as described below.

| | |
|-------------------------------------|-------|
| Silicon oil KF96L-1.5 (Toray) | 200 g |
| Salt of humic acid (Wako) | 10 g |
| Reactive silicon (FM-0711) (Chisso) | 10 g |
| Styrene (Wako) | 30 g |
| Maleic anhydride (Wako) | 3 g |
| Benzoyl peroxide | 3 g |

The mixture of the above components was charged into a flask, and polymerization reaction was effected in nitrogen atmosphere at 90°C for 8 hours. The resulting polymer solution contained precipitate, its viscosity was 4.5 cps and the conversion was 74.5%.

The polymer solution was purified by use of methanol, toluene and silicon oil to obtain Resin No. 2 mentioned in Tsubuko, column 9, line 18. It was considered that the salt of humic acid and maleic anhydride were not solved in Silicon oil KF96L-1.5, and hence the polymer solution was ununiform.

(1.2) The same procedure as in Example 4 of Tsubuko et al. was repeated to prepare an ink composition No.4.

| | Parts by weight |
|--------------------------------------------|-----------------|
| Flushed pigment No. 1 (Morimura Chemicals) | 10.0 |
| Resin No. 2 | 20.0 |
| KF 995 (Shinetsu Chemical) | 300 |

The above mixture was dispersed with 500 parts by weight of zirconia beads in a paint conditioner. After the dispersing treatment, the mixture contained large particles and small particles. After allowing the mixture stand for one day, large particles 5 μ m or more in diameter was precipitated. Thus, the mixture was poor in storage stability.

Though an attoritor was used in Tsubuko, it was replaced by zirconia beads in the above experiment because an attirtor was unavailable.

Though Flushed pigment No. 1 (Morimura Chemicals) is a mixture of a pigment wetted with water and a styrene acrylic resin, Tsubuko does not specify the ratio of these components. Thus, in the above experiment, the ratio of a pigment to a styrene acrylic resin was rendered 1:1.

(2.1) Experiment 1

Regarding sediment, printing stability and re-dischargeability, the same evaluation tests as in Example

1 of the present application were conducted. The results are shown below.

(2.2) Experiment 2

The same procedure as in Reference Example 2 of Tsubuko et al. was repeated to prepare Resin No. 2, and the same procedure as in Example 4 of Yamane et al. was repeated to obtain an ink composition No. 4.

In Tsubuko, column 14, line 67, the statement is made that the average particle size of the charged particles in the thus obtained ink composition was about 0.1 μm . Therefore, the resulting ink was filtered by use of a glass filter having pore diameter of 0.8 μm to separate an ink composition containing charged particles about 0.1 μm in average particle size. The thus separated composition was subjected to the printing tests described in the present specification, Table 3, by use of an ink jet printer (C-520 manufactured by Epson Co., Ltd.).

| | Sediment | Printing | Re-discharge- |
|--------------|----------|---------------|---------------|
| | | stability | ability |
| Experiment 1 | X | — | — |
| Experiment 2 | O | $\Delta^{1)}$ | X |

1): Printing density was low.

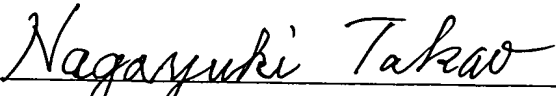
In Experiment 1, sediment was bad so that printing stability or re-dischargeability was not evaluated.

(3) As can be seen from the above results, the ink composition obtained in Reference Example 2 or Example 4 of Tsubuko are inferior to the ink composition obtained in the present invention.

Accordingly, the ink composition of the present invention is unobvious from the cited reference, and hence patentable thereover.

The undersigned declarant declares further that all statements made herein of own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed this day of *Feb. 3* 2004.


Nagayuki TAKAO